## IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

## Listing of Claims

1.     (currently amended)A storage system comprising:

a channel controller for receiving a file access data input/output (I/O) request based on file-name indication from an information processing device through a network, and transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request;

a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller;

a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and

a data transfer network connected to said channel controller, said disk controller and said first memory,

wherein the channel controller is equipped with a first processor for outputting the a-block-basis access I/O request corresponding to the file access I/O data-input/output request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O data-input/output request and the data sent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the second memory,

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and a third memory controlled by the first processor, which are formed on a circuit module, and

wherein the second processor transmits information indicating the storage position of the data in the second memory to the first processor, the first processor writes into the third memory data transfer information containing information indicating the storage position of the data in the first memory and information indicating the storage position of the data in the second memory, and the data transfer device reads out the data transfer information from the third memory and controls the data transfer between the first memory and the second memory based on ~~the basis of~~ the data transfer information thus read out.

2.    (currently amended)A storage system comprising:

a channel controller for receiving a ~~data~~ file access input/output - (I/O)request based on file-name indication from an information processing device through a network, ~~and~~ transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request;

a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller;

a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and

a data transfer network connected to said channel controller, said disk controller and said first memory,

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wherein the channel controller is equipped with a first processor for

outputting the a-block-basis access I/O request corresponding to the data

input/output,file access I/O request and controlling the first memory, a file

access circuit witch-which has a second processor and a second memory

controlled by the second processor and serves to control the

transmission/reception of the data-input/outputfile access I/O request and the

data which is sent from/to the information processing device, a data transfer

device for controlling data transfer between the first memory and the second

memory, and a third memory controlled by the first processor, which are

formed on a circuit board, and

wherein the second processor transmits information indicating the

storage position of the data in the second memory to the first processor, the

first processor writes into the third memory data transfer information

containing information indicating the storage position of the data in the first

memory and information indicating the storage position of the data in the

second memory- and transmits the storage position of the data transfer

information in the third memory to the data transfer device, and the data-

transfer device reads out the data transfer information from the third memory

and controls the data transfer between the first memory and the second

memory based on the basis of the data transfer information thus read out.


3.      (currently amended)A storage system comprising:

a channel controller for receiving a data-file access input/output (I/O)

request based on file-name indication from an information processing device

through a network, and-transmitting/receiving data to/from the information

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processing device and outputting a block access I/O request corresponding to the file access I/O request;

a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller;

a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and

a data transfer network connected to said channel controller, said disk controller and said first memory,

wherein the channel controller is equipped with a first processor for outputting the ~~a~~-block-~~basis~~ access I/O request corresponding to the file access I/O ~~data input/output~~ request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O ~~data input/output~~ request and the data ~~which is carried out~~ ~~with~~sent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the, second memory, and a third memory controlled by the first processor, which are formed on a circuit ~~board~~module, and

wherein the first processor writes into the third memory first data transfer information containing information indicating the storage position of the data in the first memory, the second processor writes into the second memory second data transfer information containing information indicating the storage position of the data in the second memory, and the data transfer device reads out the second data transfer information from the second

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memory, reads out the first data transfer information from the third memory, and controls the data transfer between the first memory and the second memory based on of the first data transfer information and the second data transfer information.

4.      (currently amended)A storage system comprising:

a channel controller for receiving a data file access input/output (I/O) request based on file-name indication from an information processing device through a network, and transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request;

a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller; and

a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and

a data transfer network connected to said channel controller, said disk controller and said first memory,

wherein the channel controller is equipped with a first processor for outputting the a block-basis access I/O request corresponding to the file access I/O data input/output request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O data input/output request and the data sent from/to which is carried out with the information processing device, a data transfer device for

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controlling data transfer between the first memory and the second memory,

and a third memory controlled by the first processor, which are formed on a

circuit ~~board~~module, and

wherein the first processor writes into the third memory first data

transfer information containing information indicating the storage position of

the data in the first memory, the second processor writes into the second

memory second data transfer information containing information indicating the

~~Storage~~storage position of the data in the second memory, the second

processor transmits information indicating the storage position of the second

data transfer information to the first processor, the first processor transmits to

the data transfer device transfer start information containing information

indicating the storage position of the first data transfer information and

information indicating the storage position of the second data transfer

information, and the data transfer device reads out the second data transfer

information from the second memory based on ~~the basis of~~ the transfer start -

information, reads out the first data transfer from the third memory on the

basis of the transfer start information, and controls the data transfer between

the first memory and the second memory based on ~~the basis of~~ the first data

transfer information and the second data transfer information.


5.      (currently amended) The storage system ~~device controlling~~
~~device~~ according to any one of claims 1 to 4, wherein the, data transfer device

writes into the third memory information indicating the result of the data

transfer carried out between the first memory and the second memory.


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6.       (currently amended)A storage system comprising:

a channel controller for receiving a ~~data~~-file access input/output (I/O)

writing request based on a file-name indication, ~~and~~ writing data from an

information processing device through a network and outputting a block

access I/O write request corresponding to the file access I/O writing request;

a disk controller for writing the writing data into a storage volume in

which data are stored based on the block access I/O write request;

a first memory including a cache memory for temporarily storing the

writing data transmitted/received between the channel controller and the disk

controller; and

a data transfer network connected to said channel controller, said disk

controller and said first memory,

wherein the channel controller contains a first processor for outputting

~~a~~ the block-~~basis~~ access I/O write request corresponding to the ~~data~~-file

access I/O writing request and controlling the first memory, a file access

circuit which has a second processor and a second memory controlled by the

second processor and serves to receive the ~~data~~-file access I/O writing

request and the writing data from the information processing device, a data

transfer device for controlling the data transfer between the first memory and

the second memory, and a third memory controlled by the first processor,

which are formed on a circuit module~~board~~, and

wherein the first processor writes into the third memory first data

transfer information containing information indicating the storage position of

the writing data in the first memory, the second processor writes into the

second memory second data transfer information containing information

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indicating the storage position of the writing data in the second memory and

transmits information indicating the storage position of the second data

transfer information to the first processor, the first processor transmits the

data transfer device transfer start information containing information indicating

the storage position of the first data transfer information and information

indicating the storage position of the second data transfer information, the

data transfer device reads out the second data transfer information from the

second memory based on the~~basis of~~the transfer start information, reads out

the first data transfer information from the third memory based on the transfer

start information and transfers the writing data from the second memory to the

first memory based on the~~basis of~~the first data transfer information and the

second data transfer information, and the disk controller writes into the

storage volume the writing data stored in the first memory on the basis of the

write request.


   7.     (currently amended)A storage system comprising:

   a channel controller for receiving a ~~data~~file access input/output (I/O)

read-out request based on a file-name indication from an information

processing device through a network, ~~and~~transmitting to the information

processing device read-out data read out from a storage volume for storing

data and outputting a block access I/O read request corresponding to the file

access I/O read-out request;

   a disk controller for reading out the read-out data from the storage

volume based on the block access I/O read request;


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a first memory including a cache memory for temporarily storing the read-out data transmitted/received for the storage volume between the channel controller and the disk controller; and

a data transfer network connected to said channel controller, said disk controller and said first memory,

wherein the channel controller comprises a first processor for outputting a the block-basis access I/O read request corresponding to the data-file access I/O read-out request and controlling the first memory, a file access circuit which has a second processor and a second memory for controlling the second processor and receives the data-file access I/O read-out request from the information processing device, a data transfer device for controlling the data transfer between the first memory and the second memory, and a third memory controlled by the first memory, which are formed on a circuit board, and

wherein the disk controller writes into the first memory the read-out data read out from the storage volume based on the basis of the read request, the first processor writes into the third memory first data transfer information containing information indicating the storage position of the read-out data in the first memory, the second processor writes into the second memory second data transfer information containing information indicating the storage position of the read-out data in the second memory and transmits information indicating the storage position of the second data transfer information to the first processor, the first processor transmits to the data transfer device transfer start information containing information indicating the storage position of the first data transfer information and information indicating the storage

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position of the second data transfer information, the data transfer device reads out the second data transfer information from the second memory based on the transfer start information, reads out the first data transfer information from the third memory based on the basis of the transfer start information and transfers the read-out data from the first memory to the second memory on the basis of the first data transfer information and the second data transfer information , and the second processor transmits the read-out data stored in the second memory to the information processing device.

8.    (currently amended)A control method for a storage system including a channel controller for receiving a data file access input/output (I/O) request based on file-name indication from an information processing device through a network, and transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request; a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller; a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and a data transfer network connected to said channel controller, said disk controller and said first memory, the channel controller being equipped with a first processor for outputting a the block basis access I/O request corresponding to the data file access I/Oinput/output request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the

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second processor and serves to control the transmission/reception of the ~~file~~ <u>file</u>

<u>access I/O</u> ~~data input/output~~ request and the data ~~which is carried out~~

~~with~~<u>sent from/to</u> the information processing device, a data transfer device for

controlling data transfer between the first memory and the second memory,

and a third memory controlled by the first processor, which are formed on a

circuit board, said control method comprising the steps of:

transmitting, by the second processor, information indicating the

storage position of the data in the second memory to the first processor;

writing, by the first processor, into the third memory data transfer

information containing information indicating the storage position of the data in

the first memory and information indicating the storage position of the data in

the second memory~~;~~<u>; and</u>

by the data transfer device, reading out the data transfer information

from the third memory, and controlling the data transfer between the first

memory and the second memory based on the data transfer information thus

read out.


9.    (currently amended)A control method for a storage system

including a channel controller for receiving a ~~data~~<u>file access</u> input/output <u>(I/O)</u>

request based on file-name indication from an information processing device

through a network,~~and~~ transmitting/receiving data to/from the information

processing device <u>and outputting a block access I/O request corresponding to</u>

<u>the file access I/O request</u>; a disk controller for carrying out input/output

control of data stored in a storage volume for storing the data <u>based on the</u>

<u>block access I/O request output by said channel controller</u>; a first memory

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including a cache memory for temporarily storing the data delivered between

the channel controller and the disk controller; and a data transfer network

connected to said channel controller, said disk controller and said first

memory, the channel controller being equipped with a first processor for

outputting thea block-basis access I/O request corresponding to the file

access I/O data input/output-request and controlling the first memory, a file

access processor-circuit which has a second processor and a second memory

controlled by the second processor and serves to —control the

transmission/reception of the file access I/O data input/output-request and the

data sent from/to which is carried out with the information processing device,

a data transfer device for controlling data transfer between the first memory

and the second memory, and a third memory controlled by the first processor,

which are formed on a circuit boardmodule, said control method comprising

the steps of:

transmitting, by the second processor, information indicating the

storage position of the data in the second memory to the first processor;

by the first processor, writing into the third memory data transfer

information containing information indicating the storage position of the data in

the first memory and information indicating the storage position of the data in

the second memory, and transmitting the storage position of the data transfer

information in the third memory to the data transfer device; and

by the data transfer device reading out the data transfer information

from the third memory, and controlling the data transfer between the first

memory and the second memory based on the data transfer information thus

read out.

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10. (currently amended)A control method for a storage system including a channel controller for receiving a ~~data~~ file access input/output (I/O) request based on file-name indication from an information processing device through a network, ~~and~~ transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request; a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by said channel controller; a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller; and a data transfer network connected to said channel controller, said disk controller and said first memory, the channel controller being equipped with a first processor for outputting a the block-~~basis~~ access I/O request- corresponding to the file access I/O ~~data input/output~~ request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O ~~data input/output~~ request and the data which is ~~carried out~~ ~~with~~sent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the second memory, and a third memory controlled by the first processor, which are formed on a circuit board, said control method comprising the steps of:

writing, by the first processor into the third memory first data transfer information containing information indicating the storage position of the data in the first memory;

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writing, by the second processor, into the second memory second data

transfer information containing information indicating the, storage position of

the data in the second memory; and

by the data transfer device, reading out the second data transfer

information from the second memory, reading out the first data transfer

information from the third memory, and controlling the data transfer between

the first memory and the second memory based on the basis of the first data

transfer information and the second data transfer information.


11.    (currently amended)A control method for a storage system

including a channel controller for receiving a data file access input/output (I/O)

request based on file-name indication from an information processing device

through a network, and transmitting/receiving data to/from the information

processing device and outputting a block access I/O request corresponding to

the file input/output request; a disk controller for carrying out input/output

control of data stored in a storage volume for storing the data based on the

block access I/O request output by said channel controller; a first memory

including a cache memory for temporarily storing the data delivered between

the channel controller and the disk controller; and a data transfer network

connected to said channel controller, said disk controller and said first

memory, the channel controller being equipped with a first processor for

outputting a the block basis access I/O request corresponding to the file

access I/O data input/output request and controlling the first memory, a file

access processor circuit which has a second processor and a second memory

controlled by the second processor and serves to control the

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transmission/reception of the file access I/O data input/output request and the data which is carried out withsent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the second memory, and a third memory controlled by the first processor, which are formed on a circuit boardmodule, said control method comprising the steps of:

writing, by the first processor, into the third memory first data transfer information containing information indicating the storage position of the data in the first memory;

writing, by the second processor, into the second memory second data transfer information containing information indicating the storage position of the data in the second memory;

transmitting, by the second processor, information indicating the storage position of the second data transfer information to the first processor;

transmitting, by the first processor, to the data transfer device transfer start information containing information indicating the storage position of the first data transfer information and information indicating the storage position of the second data transfer information; and

by the data transfer device, reading out the second data transfer information from the second memory based on the transfer start information, reading out the first data transfer from the third memory, based on the transfer start information, and controlling the data transfer between the first memory and the second memory based on the basis of the first data transfer information and the second data transfer information.

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12.    (original)    The control method according to any one of claims 8 to 11, wherein the data transfer device writes into the third memory information indicating the result of the data transfer carried out between the first memory and the second memory.

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13.    (currently amended)A control method for a storage system including a channel controller for receiving a data-file access input/output (I/O) writing request based on a file-name indication, and writing data from an information processing device through a network and outputting a block access I/O write request corresponding to the file access I/O writing request; a disk controller for writing the writing data into a storage volume in which data are stored based on the block access I/O write request output by said channel controller; a first memory including a cache memory for temporarily storing the writing data transmitted/received between the channel controller and the disk controller; and a data transfer network connected to said channel controller, said disk controller and said first memory, the channel controller being equipped with a first processor for outputting a-the block-basis access I/O write request corresponding to the data-file access I/O writing request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to receive the data-file access I/O writing request and the writing data from the information processing device, a data transfer device for controlling the data transfer between the first memory and the second memory, and a third memory controlled by the first processor, which are formed on a circuit boardmodule, said control method comprising the steps of:

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writing, by the first processor, into the third memory first data transfer
information containing information indicating the storage position of the writing
data in the first memory;

by the second processor, writing into the second memory second data
transfer information containing information indicating the storage position of
the writing data in the second memory, and transmitting information indicating
the storage position of the second data transfer information to the first
processor;

transmitting, by the first processor, the data transfer device transfer
start information containing information indicating the storage position of the
first data transfer information and information indicating the storage position of
the second data transfer information; and

by the data transfer device, reading out the second data transfer
information from the second memory based on the basis of the transfer start
information, reading out the first data transfer information from the third
memory based on the basis of the transfer start information, and transferring
the writing data from the second memory to the first memory based on the
first data transfer information and the second data transfer information; and

writing, by the disk controller into the storage volume the writing data
stored in the first memory based on the write request.


14.     (currently amended)A control method for a storage system
including a channel controller for receiving a data file access input/output (I/O)
read-out request based on a file-name indication from an information
processing device through a network, and transmitting to the information

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processing device read-out data readout from a storage volume for storing

data and outputting a block access I/O read request corresponding to the file

access I/O read-out request; a disk controller for reading out the read-out data

from the storage volume based on the block access I/O read request output

by said channel controller; a first memory including a cache memory for

temporarily storing the read-out data transmitted/received between the

channel controller and the disk controller; a data transfer network connected

to said channel controller, said disk controller and said first memory, the

channel controller being equipped with a first processor for outputting a the

block-basis access I/O read request corresponding to the data-file access I/O

read-out request and controlling the first memory, a file access processor

circuit which has a second processor and a second memory for controlling the

second processor and receives the file access I/O data-read-out request from

the information processing device, a data transfer device for controlling the

data transfer between the first memory and the second memory, and a third

memory controlled by the first memory, which are formed on a circuit

boardmodule, said control method comprising the steps of:

writing, by the disk controller, into the first memory the read-out data

readout from the storage volume based on the basis of the read request;

writing, by the first processor, into the third memory first data transfer

information containing information indicating the storage position of the read-

out data in the first memory;

by the second processor, writing into the second memory-second data

transfer information containing information indicating the storage position of

the read-out data in the second memory and transmitting information

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indicating the storage position of the second data transfer information to the first processor;

transmitting, by the first processor, to the data transfer device transfer start information containing information indicating the storage position of the first data transfer information and information indicating the storage position of the second data transfer information;

by the data transfer device, reading out the second data transfer information from the second memory based on the transfer start information, reading out the first data transfer information from the third memory based on the transfer start information and transferring the read-out data from the first memory to the second memory based on the first data transfer information and the second data transfer information; and

transmitting, by the second processor the read-out data stored in the second memory to the information processing device.

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